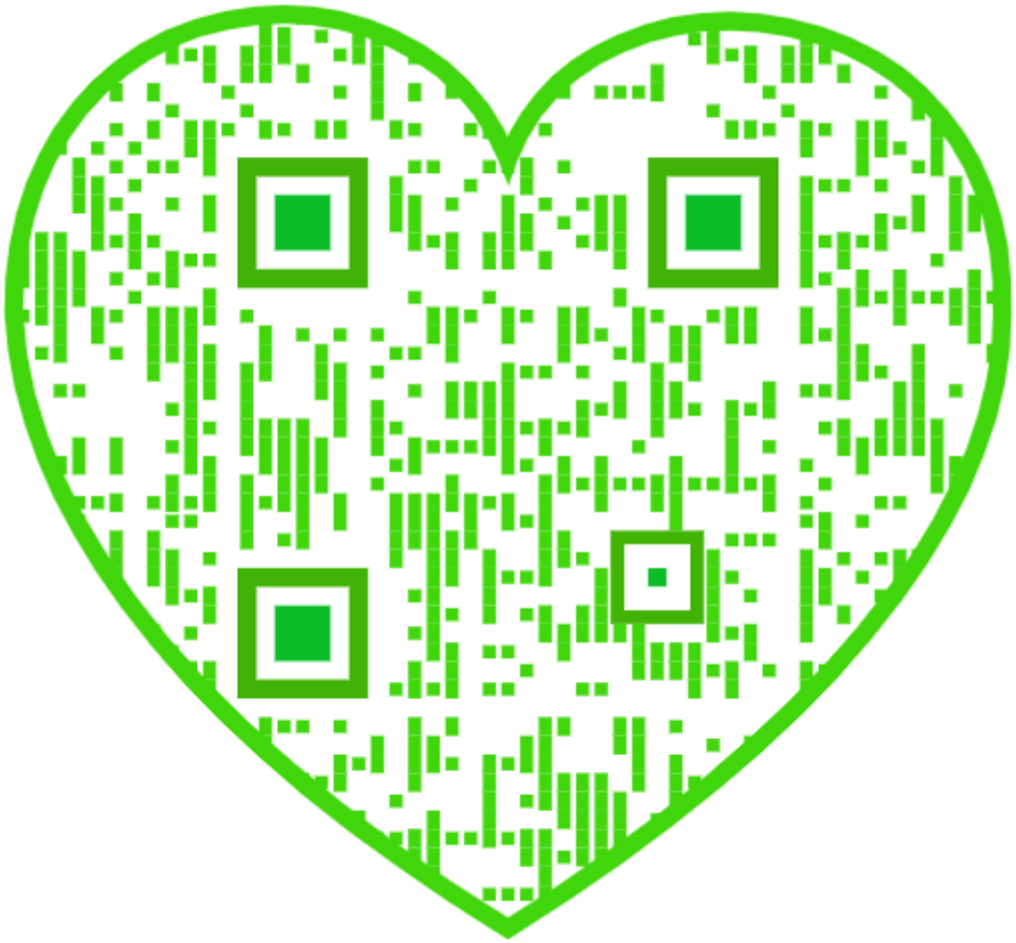

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AN EXPERIMENTAL TURPENTINE STILL

For use in Gum Buying and Experimental Naval Stores Work

By
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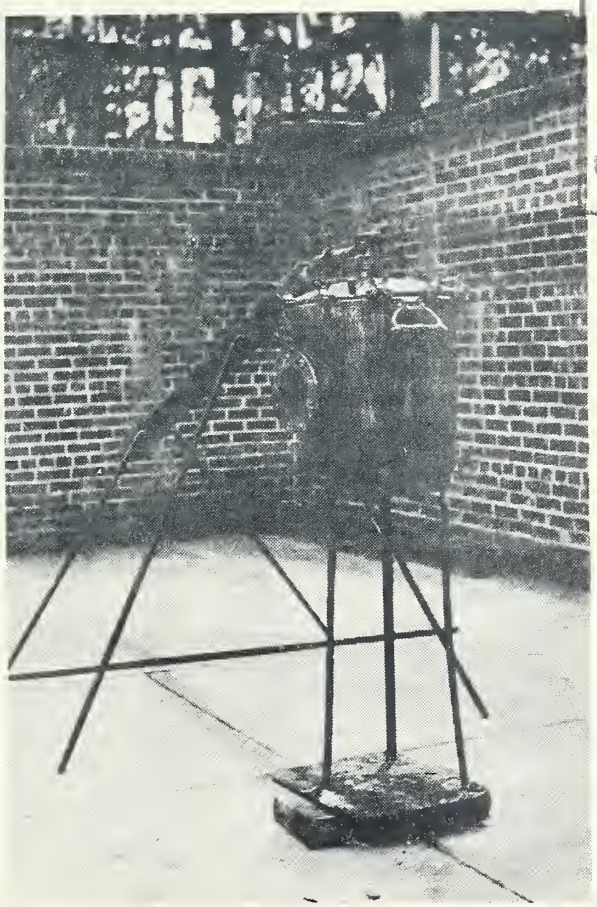
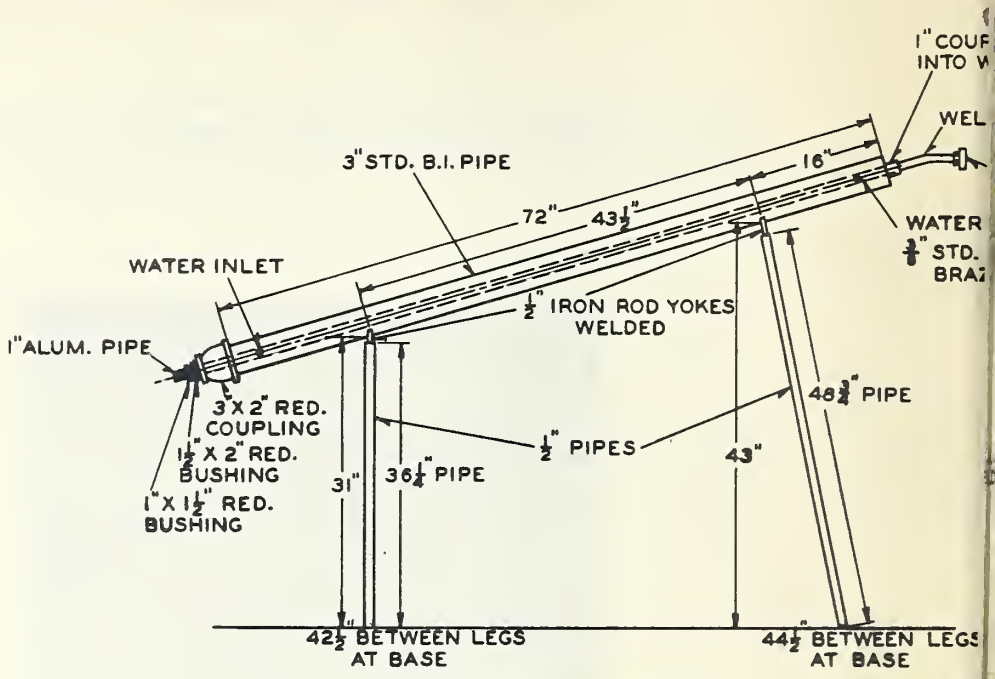


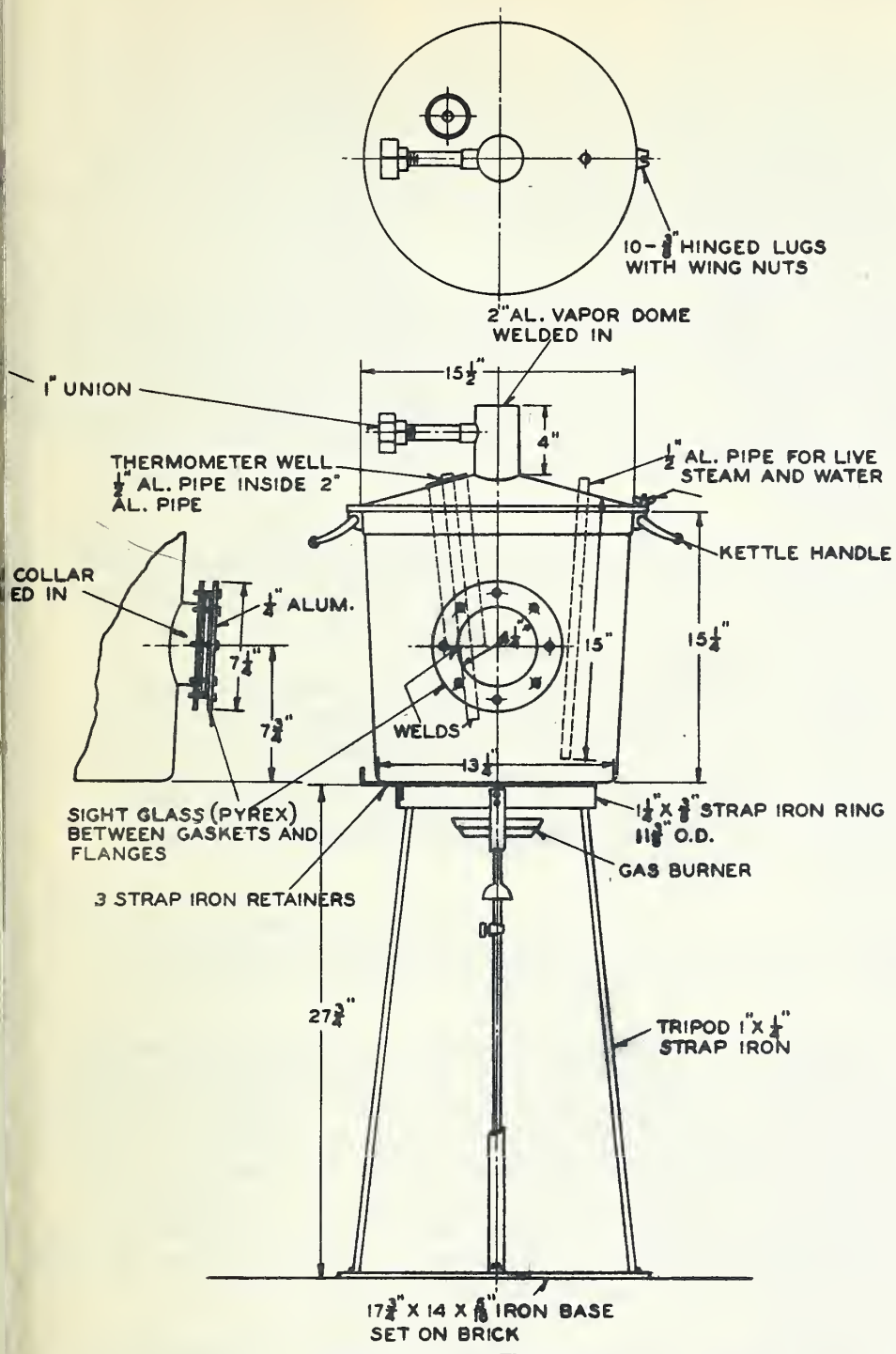
The most dependable method of determining the quality of turpentine gum is to distill it and calculate its value from the products of distillation. If properly carried out this will give the amount of turpentine and the grade and amount of rosin, as well as amount of trash in a sample of gum. This is of particular importance at the present time, due to the increasing amount of turpentine gum being sold on the basis of the grade and quantity of rosin and amount of turpentine it will produce upon distillation.

With this in mind the Naval Stores Station has built a small experimental still in which one-tenth of a barrel of gum may be distilled in thirty to forty-five minutes. The results on this still are comparable to those obtained on a full-size fire still properly operated.



CONDENSER

(FOR PILOT PLANT PRESSURE COOKER STILL)



PILOT PLANT STILL

(BUILT FROM 10 GAL. ALUMINUM PRESSURE COOKER)

The still was made from a 10-gallon aluminum pressure cooker and other standard stock parts. However, an experimental still could be built of such non-corrosive metals as copper, monel metal and stainless steel. A number of holes were cut into the cooker top to adapt it for use as a still. The three-quarter-inch holes were used for a thermometer well and steam injector tube, and to add water to the charge.

This still can be used for the distillation of gum on a scale larger than with the laboratory flask and smaller than with a regulation still. The advantage of this size permits the distillation of a more representative sample than does the flask, and does not require the use of a full eight- or ten-barrel charge of gum. This small experimental still has been found very convenient at the Station in determining experimental results from various classes of crude gum and many modifications in gum processing.

The aluminum pressure cooker is recommended in making the still, since it effects a saving in time and cost of fabrication, and provides a still of ample size, optimum shape and opening for charging crude gum and discharging the rosin.

The minimum to maximum "charge capacity" of a commercial still ranges from about 50 to 75 per cent of the actual volume of the still. Thus, a charge for the 10-gallon pilot plant still consists of 5 to 7.5 gallons of crude gum. Although smaller amounts can be handled satisfactorily, it is difficult to obtain a representative sample of crude gum smaller in volume than 5 gallons because of the chips and other foreign materials present in the gum.

One of the advantages in using the cooker is the large mouth which makes charging and discharging easy, effecting a complete removal of rosin from the still at the end of each run.

This still is heated by a direct gas flame, although other means, such as gasoline flame, steam coils, oil bath or an electrical resistance unit, might be used. However heated, precautions must be taken to control the temperature of gum in the still to prevent rosin degradation. This control is effected by a long-stem thermometer thrust in a well or jacket which reaches below the level of the final liquid rosin. Turpentine is removed from crude gum principally by a steam distillation. Provision is made in this case for the addition of live steam. Also, water may be added to the charge during distillation and vaporized by heat supplied to the still.

This small experimental still is adaptable also to cleaned gum.

The sketch shows a single tube condenser. The still can be operated with any type of condenser, of sufficient size, that can be conveniently hooked to it. In fact, a small vertical tubular condenser is recommended. With the latter type of condenser, accurate turpentine yields can be obtained when the still is run at a rapid rate.

Although this still was built from a die-cast pressure vessel, one could be made from sheet metal of about 10-gage thickness, since there is no advantage in the strength of materials of this "pressure vessel" over that which is required for operation at atmospheric pressure.